

CLAIMS:

1. A medical therapy delivery device, comprising:
 - a shaft formed by an outer layer and including a first portion and a second portion extending distally from the first portion, the second portion deflectable relative to the first portion;
 - a deflectable tip extending distally from the second portion between a proximal end and a distal tip, and having a tapered portion located between the proximal end and the distal tip;
 - a manipulator wire extending through the shaft to adjust deflection of the second portion of the shaft relative to the first portion; and
 - a thru lumen tubing forming a thru lumen to transfer one of an elongated mechanical structure and a fluid through the device, wherein the outer layer forms a single shaft lumen having a first lumen portion positioned about the thru lumen tubing and a second lumen portion, offset from and in fluid communication with the first lumen portion, the second lumen portion having a first side wall, a second side wall and a bottom wall extending between the first side wall and the second side wall, the thru lumen tubing, the first side wall, the second side wall and the bottom wall positioning the manipulator wire within the second lumen portion.
2. The device of claim 1, wherein the outer layer is formed of polyether block amide (PEBA).
3. The device of claim 2, wherein the outer layer includes a stainless steel braiding and has a Durometer reading of 72D along the first portion and is non-braided and has a Durometer reading of 40D along the second portion of the shaft.
4. The device of claim 1, wherein the deflectable tip is formed of a radio opaque and echo-genic polymer material.

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5. The device of claim 4, wherein the deflectable tip is formed by a PEBA material loaded with jet milled tungsten carbide, and has a Durometer reading of 35D.

6. The device of claim 1, wherein the deflectable tip includes an outer wall and an inner wall forming a tip lumen in fluid communication with the thru lumen and a distal opening at the distal tip, and wherein the outer wall is spaced approximately 0.024 inches from the inner wall between a proximal end of the deflectable tip and a proximal end of the tapered portion, and is spaced approximately 0.012 inches from the inner wall between a distal end of the tapered portion and the distal tip, and wherein a distance between the outer wall and the inner wall gradually decreases between the proximal end and the distal end of the tapered portion.

7. The device of claim 1, wherein the thru lumen tubing is formed by a PEBA material having a Durometer reading of 72D.

8. The device of claim 1, wherein the device has an outer diameter of 7 French or less between a proximal end of the first portion and a proximal end of the tapered portion, and the deflectable tip has an outer diameter of 6 French or less between the proximal end of the tapered portion and the distal tip.

9. The device of claim 6, wherein the thru lumen and the tip lumen have a diameter of approximately 0.039 inches.

10. The device of claim 1, wherein the manipulator wire has a diameter of approximately 0.009 inches.

11. The device of claim 1, further comprising:
an anchoring device, positioned along a distal end of the second portion, fixedly engaged with the manipulator wire; and

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a transition tubing forming a transition lumen, the transition tubing positioned within the second lumen portion and extending from a proximal end positioned along a distal end of the first portion to a distal end positioned along the second portion of the shaft to provide a stiffness transition between the first portion and the second portion of the shaft, wherein the manipulator wire extends through the transition lumen.

12. The device of claim 11, wherein the transition tubing is formed of a polyimide material having a Durometer reading of 86D.

13. The device of claim 11, further comprising a compressible member positioned between the distal end of the transition tubing and the anchoring band, wherein the manipulator wire extends through the compressible member and the compressible member is free to move relative to the manipulator wire and the shaft during deflection of the second portion of the shaft.

14. The device of claim 13, wherein the compressible member has an inner diameter of approximately 0.013 inches and an outer diameter of approximately 0.024 inches.

15. The device of claim 13, wherein a distal end of the compressible member is fixedly engaged with the outer layer to fixedly position the distal end of the compressible member within the shaft.

16. The device of claim 1, wherein the thru lumen tubing is free to slide within the shaft during deflection of the second portion of the shaft.

17. The device of claim 13, wherein the transition tubing has a stiffness that is greater than the compressible member.

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18. The device of claim 11, wherein the outer layer includes a stainless steel braiding and has a Durometer reading of 72D along the first portion of the shaft, and is non-braided and has a Durometer reading of 40D along the second portion of the shaft, and the transition tubing has a length of approximately one inch.

19. The device of claim 1, wherein the first side wall extends from a first end to a second end, the second side wall extends from a third end to a fourth end, and the bottom wall extends between the first end and the third end, and wherein the first lumen portion extends from a first endpoint to a second endpoint and includes a first flange and a second flange, the first flange extending between the first endpoint and the second end, and the second flange extending between the second endpoint and the fourth end.

20. The device of claim 1, further comprising a transition tubing forming a transition lumen, the transition tubing positioned within the second lumen portion and extending from a proximal end positioned along a distal end of the first portion to a distal end positioned along the second portion of the shaft to provide a stiffness transition between the first portion and the second portion of the shaft, wherein the manipulator wire extends through the transition lumen, the first side wall extends from a first end to a second end, the second side wall extends from a third end to a fourth end, and the bottom wall extends between the first end and the third end, and wherein the first lumen portion extends from a first endpoint to a second endpoint and includes a first flange extending between the first endpoint and the second end, and a second flange extending between the second endpoint and the fourth end, and wherein the thru lumen tubing, the first side wall, the second side wall, and the bottom wall position the transition tubing within the second lumen portion.

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21. The device of claim 1, further comprising:
 - an anchoring device, positioned along a distal end of the second portion, fixedly engaged with the manipulator wire;
 - a transition tubing forming a transition lumen, the transition tubing positioned within the second lumen portion and extending from a proximal end positioned along a distal end of the first portion to a distal end positioned along the second portion of the shaft to provide a stiffness transition between the first portion and the second portion of the shaft, the manipulator wire extending through the transition lumen; and
 - a compressible member positioned between the distal end of the transition tubing and the anchoring band, wherein the manipulator wire extends through the compressible member and the compressible member is free to move relative to the manipulator wire and the shaft during deflection of the second portion of the shaft, the first side wall extends from a first end to a second end, the second side wall extends from a third end to a fourth end, and the bottom wall extends between the first end and the third end, and wherein the first inner wall portion extends from a first endpoint to a second endpoint and includes a first flange extending between the first endpoint and the second end, and a second flange extending between the second endpoint and the fourth end, and wherein the thru lumen tubing, the first side wall, the second side wall, and the bottom wall position the compressible member within the second lumen portion.
22. The device of claim 1, wherein the first lumen portion is generally semi-circular in shape and the second lumen portion is generally rectangular in shape.
23. A medical therapy delivery device, comprising:
 - a shaft formed by an outer layer and including a first portion and a second portion extending distally from the first portion, the second portion deflectable relative to the first portion;

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a deflectable tip extending distally from the second portion between a proximal end and a distal tip, and having a tapered portion located between the proximal end and the distal tip;

a manipulator wire extending through the shaft to adjust deflection of the second portion of the shaft relative to the first portion;

a thru lumen tubing forming a thru lumen to transfer one of an elongated mechanical structure and a fluid through the device, wherein the outer layer forms a single shaft lumen having a first lumen portion positioned about the thru lumen tubing and a second lumen portion, offset from and in fluid communication with the first lumen portion, the second lumen portion having a first side wall, a second side wall and a bottom wall extending between the first side wall and the second side wall;

an anchoring device, positioned along a distal end of the second portion, fixedly engaged with the manipulator wire;

a transition tubing forming a transition lumen, the transition tubing positioned within the second lumen portion and extending between the first portion and the second portion of the shaft to provide a stiffness transition between the first portion and the second portion of the shaft, the manipulator wire extending through the transition lumen; and

a compressible member positioned between a distal end of the transition tubing and the anchoring band, wherein the manipulator wire extends through the compressible member and the compressible member is free to move relative to the manipulator wire and the shaft during deflection of the second portion of the shaft, and wherein the thru lumen tubing, the first side wall, the second side wall and the bottom wall positioning the manipulator wire within the second lumen portion.

24. The device of claim 23, wherein the deflectable tip includes an outer wall and an inner wall forming a tip lumen in fluid communication with the thru lumen and a distal opening at the distal tip, and wherein the outer wall is spaced a first distance from the inner wall between a proximal end of the deflectable tip and a proximal end of the tapered portion, and is spaced a

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second distance less than the first distance from the inner wall between a distal end of the tapered portion and the distal tip, and wherein a distance between the outer wall and the inner wall gradually decreases between the proximal end and the distal end of the tapered portion.

25. The device of claim 24, wherein the device has an outer diameter of 7 French or less between a proximal end of the first portion and a proximal end of the tapered portion, and the deflectable tip has an outer diameter of 6 French or less between the proximal end of the tapered portion and the distal tip.

26. The device of claim 25, wherein the thru lumen tubing, the first side wall, the second side wall, and the bottom wall position the transition tubing within the second lumen portion.

27. The device of claim 26, wherein the outer layer is formed of polyether block amide (PEBA) and includes a stainless steel braiding and has a Durometer reading of 72D along the first portion and is non-braided and has a Durometer reading of 40D along the second portion of the shaft.

28. The device of claim 27, wherein the deflectable tip is formed by a PEBA material loaded with jet milled tungsten carbide, and has a Durometer reading of 35D.

29. The device of claim 28, wherein the thru lumen tubing is formed by a PEBA material having a Durometer reading of 72D.

30. The device of claim 29, wherein the transition tubing is formed of a polyimide material having a Durometer reading of 86D.

31. The device of claim 30, wherein the first side wall extends from a first end to a second end, the second side wall extends from a third end to a fourth

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end, and the bottom wall extends between the first end and the third end, and wherein the first lumen portion extends from a first endpoint to a second endpoint and includes a first flange and a second flange, the first flange extending between the first endpoint and the second end, and the second flange extending between the second endpoint and the fourth end.

32. The device of claim 31, wherein a distal end of the compressible member is fixedly engaged with the outer layer to fixedly position the distal end of the compressible member within the shaft.

33. The device of claim 32, wherein the thru lumen tubing is free to slide within the shaft during deflection of the second portion of the shaft.

34. The device of claim 33, wherein the transition tubing has a stiffness that is greater than the compressible member.

35. The device of claim 34, wherein the compressible member has an inner diameter of approximately 0.013 inches and an outer diameter of approximately 0.024 inches.

36. The device of claim 35, wherein the thru lumen and the tip lumen have a diameter of approximately 0.039 inches.

37. The device of claim 36, wherein the manipulator wire has a diameter of approximately 0.009 inches.

38. The device of claim 37, wherein the first lumen portion is generally semi-circular in shape and the second lumen portion is generally rectangular in shape.

39. The device of claim 38, wherein the transition tubing has a length of approximately one inch.